

CLAIM LISTING

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-15 (Cancelled)

Claim 16 (Currently amended): A method of fabricating an anisotropic, single crystal shape memory alloy having hyperelastic properties for use as a guidewire, the anisotropic single crystal shape memory alloy material formed being deformable at a constant force at recoverable strain of at least 9% with a very narrow loading-unloading hysteresis, a recovery which is completely repeatable and complete and a very low yield strength when martensitic, the method comprising the steps of:

lowering a seed of a copper aluminum based alloy into providing a molten melt of a copper aluminum based alloy, wherein the seed is aligned on the <100> crystallographic direction in a direction of pulling,

pulling a column of the alloy of a length greater than 42 inches from the melt by pulling at a predetermined pulling rate so that the rising column is cooled relative to the melt, to form a crystallization front above the surface of the melt, wherein the melt has a composition so that the pulled single crystal column has a transition temperature from martensite to austenite that is below 37 degrees Celsius,

applying a predetermined hydrostatic pressure on the column and heating the column to a predetermined temperature, the predetermined pulling rate, hydrostatic pressure and temperature being sufficient to crystallize the alloy in the column into a single crystal, and
rapidly quenching the single crystal.

Claim 17 (Previously presented): A method as in claim 16 in which the predetermined temperature is at least about 1000 degrees Celsius and the quenching step is carried out by quenching from about 850 degrees Celsius.

Claim 18 (Previously presented): A method as in claim 16 in which the compositions of the alloy are substantially 80 percent Cu, 15 percent Al and 5 percent of a metal selected from the group consisting of Ni, Co, Mn, Fe.

Claim 19 (Previously presented): A method as in claim 16 in which the quenching step is carried out by quenching the alloy in salt water.

Claim 20 (Currently amended): A method as in claim 16, further comprising in which the single crystal shape memory alloy is for use as a guidewire in medical procedures, the step of pulling the column is sufficient to form a length of wire, and grinding the surface of the wire to a diameter in the range of from 0.012 inches to 0.039 inches.

Claim 21 (Previously presented): A method as in claim 16 in which the grinding step is carried out by centerless grinding of the surface.

Claim 22 (Previously presented): A method as in claim 20 and further comprising the step of electropolishing the wire to a smoothness of less than 0.0001 inches.

Claim 23 (Previously presented): A method as in claim 20 and further comprising the step of coating the surface of the wire with a material selected from the group consisting of gold, a biocompatible plastic, and a biocompatible polymer.

Claim 24 (Previously presented): A method as in claim 20 and further comprising the step of coating the surface of the wire with a lubricant.

Claim 25 (Previously presented): A method as in claim 20 and further comprising the step of etching a portion of the surface of the wire in a mixture of hydrofluoric acid and nitric acid in amounts which reduce the diameter of the wire sufficient to increase the flexibility of the portion.

Claim 26 (Previously presented): A method as in claim 16 in which the step of pulling the column is carried out by pulling a hollow cross-sectional elongated shaped column.

Claim 27 (Previously presented): A method as in claim 20 in which the column has an outer layer comprised of CuAlNi polycrystal, and further comprising the step of removing the polycrystal in the outer layer.

Claims 28 - 49 (Cancelled)

Claim 50 (New): A method as in claim 16, further comprising re-heating the column, and rapidly quenching to retain the nickel and aluminum dissolved in the copper matrix.

Claim 51 (New): A method as in claim 16, further comprising maintaining a constant temperature of the melt as the column is pulled.

Claim 52 (New): The method of claim 16, further comprising pulling the column through a die at the surface of the melt so that the crystallization front is above the surface of the melt and the die.

Claim 53 (New): The method of claim 16, further comprising altering the composition of the melt to form a region of the pulled column that has a transition temperature above 37 degrees Celsius, and thereby forming a non-elastic segment.

Claim 54 (New): The method of claim 53, wherein the step of altering the composition is performed to form a non-elastic tip region on the formed guidewire.